## WE CLAIM:

1	<ol> <li>A method for determining a formation profile surrou</li> </ol>	nding a well	
2	bore, comprising the steps of:		
3	(a) receiving field log data for a formation surroundi	ng the well	
4	bore;		
5	(b) generating a Jacobian matrix responsive to the	field log data;	
6	(c) solving for a new formation conductivity profile u	ising the	
7	Jacobian matrix;		
8	(d) calculating a new log response using the n	ew formation	
9	conductivity profile;		
10	(e) determining if the log response converges with	the received	
11	field log data;		
12	(f) performing a quasi-Newton update of the Jacobi	an matrix and	
13	repeating step (c) and (e) if the log response does not converge with the		
14	received field log data; and		
15	(g) outputting the formation profile based upon the	log response	
16	if the log response converges with the received field log data.		
1	<ol><li>The method of Claim 1, wherein the step of gene</li></ol>	erating further	
2	comprises the steps of:		
3	determining an initial vector from the field log da	ta, said initial	
4	vector being at least one of a conductivity or resistivity vector; and		
5	generating the Jacobian matrix using a sliding will	ndow and the	
6	initial vector.		
1	<ol><li>The method of Claim 2, wherein the method of g</li></ol>	enerating the	
2	Jacobian matrix using the sliding window further comprises the steps of:		
3	determining a single column vector of the Jacobian matrix based		
4	on a three-bed formation; and		
5	sliding the single column vector across the formation	on to populate	
6	the Jacobian matrix.		

- 1 4. The method of Claim 1, further including the step of applying a 2 maximum flatness inversion algorithm to the received field log data.
- 1 5. The method of Claim 1, wherein the step of determining further comprises the step of comparing the determined log response to the received field log data to determine any differences therebetween.
- 1 6. The method of Claim 1, wherein the step of performing further 2 comprises the step of performing a quasi-Newton update responsive to the 3 determined log response and a presently existing Jacobian matrix.

1	7.	A method for determining a formation profile surrounding a well	
2	bore, comprising the steps of:		
3		(a) receiving field log data for a formation surrounding the well	
4	bore;		
5		(b) determining an initial vector from the field log data, said initial	
6	vector being a conductivity or resistivity vector;		
7		(c) generating the Jacobian matrix using a sliding window and	
8	the initial vector;		
9		(d) solving for a formation conductivity vector using the Jacobian	
10	matrix with maximum flatness constraint;		
11		(e) calculating a log response using the new formation	
12	conductivity vector;		
13		(f) determining if the log response converges with the received	
14	field log data;		
15		(g) performing a quasi-Newton update of the Jacobian matrix	
16	and repeating step (d) and (f) if the log response does not converge with the		
17	received field log data; and		
18		(h) outputting the formation profile based upon the log response	
19	if the log response converges with the received field log data.		
1	8.	The method of Claim 7, wherein the method of generating the	
2	Jacobian matrix using the sliding window further comprises the steps of:		
3		determining a single column vector of the Jacobian matrix based	
4	on a three-bed formation; and		
5		sliding the single column vector across the formation to populate	
6	the Jacobian matrix.		
1	9.	The method of Claim 7, wherein the step of determining further	
2	comprises the step of comparing the determined log response to the received		
3	field log data to determine any differences therebetween.		

- 1 10. The method of Claim 7, wherein the step of solving further
- 2 comprises performing a gradient based iterative inversion.

1	11.	A method for determining a formation profile surrounding a well	
2	bore, comprising the steps of:		
3		(a) receiving field log data for a formation surrounding the well	
4	bore;		
5		(b) determining an initial vector from the field log data, said initial	
6	vector being a conductivity or resistivity vector;		
7		(c) generating the Jacobian matrix using a sliding window and	
8	the initial vector;		
9		(d) generating the Jacobian Matrix using a sliding window and	
10	the initial vector said step further comprising the steps of:		
11		determining an single column vector of the Jacobian	
12	matrix using a three-bed formation; and		
13		sliding the single column vector across the formation to	
14	populate the Jacobian matrix;		
15		(e) solving for a formation conductivity vector using the Jacobian	
16	matrix with r	naximum flatness constraint;	
17		(f) calculating a log response using the new formation	
18	conductivity vector;		
19		(g) determining if the log response converges with the received	
20	field log data	a;	
21		(h) comparing the determined log response to the received field	
22	log data to determine if the log response converges with the received field log		
23	data;		
24		(i) performing a quasi-Newton update of the Jacobian matrix and	
25	repeating step (e) and (f) if the log response does not converge with the		
26	received field log data; and		
27	(j) outputting the formation profile based upon the log response		
28	if the log response converges with the received field log data.		